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Abstract

Title: **Children with Bronchospasm on Induction of Anesthesia are at Increased risk for Having Received Rapacuronium**

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Introduction: Rapacuronium bromide, a new steroidal, nondepolarizing neuromuscular blocking agent with rapid onset and a short recovery time is a potential alternative to succinylcholine, as it provides comparable intubating conditions without the associated side effects of hyperkalemia, myalgia, and the risk of triggering malignant hyperthermia[1]. Hypotension, bronchospasm, and erythema related to histamine release have been reported with non-depolarizing muscle relaxants[2]. This retrospective case-control study was designed to answer the question, "Are children with bronchospasm on induction of anesthesia more likely to have received rapacuronium compared to other muscle relaxants?".

Methods: Our computerized anesthesia record system and continuous quality improvement database were queried to find all cases where Albuterol aerosol treatment or rapacuronium was administered to patients $\leq$ 18 years old between March 1 and July 31, 2000. The criteria used by two independent reviewers for identification of bronchospasm on induction of anesthesia included either a statement in the narrative of the anesthesia record or the use of a bronchodilator within 15 minutes after induction. Four controls for each case of bronchospasm were selected from patients undergoing procedures on the same day, by matching the last digit of medical record number with a table of random digits. Patients were excluded from the control group if they had a preoperative endotracheal tube or tracheostomy, if no muscle relaxant was administered or age greater than 18 years. Data abstracted from each anesthesia record included: age, weight, sex, ASA physical status, muscle relaxant used during induction of anesthesia, mode of induction of anesthesia [rapid or modified rapid sequence induction (RSI or MRSI) vs. inhalational and routine IV induction], IV induction drug (propofol vs. thiopental), prior history of reactive airways disease (RAD) or drug allergy. Univariate analyses were conducted using an unpaired t-test for parametric variables, Fisher's exact test and odd ratios (OR) with 95% confidence intervals were calculated for categorical variables.

Results: During this five month time period, 7558 patients received general anesthesia, with 79 developing intraoperative bronchospasm, but only 23 within 15 minutes after induction. Twelve of these 23 subjects received rapacuronium and 11 received other muscle relaxants. There were no significant differences between the two groups in age, weight, sex, ASA physical status, RAD, IV induction drug, or history of drug allergy (Table). Children with bronchospasm on induction of anesthesia are at a ten-fold increased risk for having received rapacuronium compared to other muscle relaxants.

Conclusion: Children with bronchospasm on induction of anesthesia have a ten-fold increase in risk for having received rapacuronium compared to other muscle relaxants.

[1]Meakin, GH, et al. Anesthesiology 2000; 92:1002-9. [2]Fisher, DM. BJA 1999;83:58-64.

	Case (Bronchospasm)	Controls	p-value or OR(95%CI)
Age (years ±SD)	6.2±1.0	6.7±5.2	p=0.65
Female (%)	12(52.2%)	43(46.7%)	p=0.65
ASA 3 or 4(%)	8(34.8%)	21(22.8%)	p=0.28
RAD(%)	10(43.5%)	20(21.7%)	p=0.06
Propofol/Thiopental(N=47)	8/6	18/15	p=1.00
Rapacuronium	12	9	
Other muscle relaxants	11	83	
N	23	92	OR=10.1(3.5-28.8)

Summary:
A retrospective case-control study where bronchospasm occurred < 15 minutes after induction of anesthesia identified 23 cases. Children with bronchospasm on induction of anesthesia have a ten-fold increase in risk for having received rapacuronium compared to other muscle relaxants.